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ADAPTIVE DIGITAL CONTROL FOR WEAPONS AND COMMUNICATION SYSTEMS.(U)
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University of Florida
Department of Electrical Engineering
Gainsville, FL 32611

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Final Report

Contract Number N014-68-A-0173-0001

This project started on October 1, 1967 and terminated on September 30, 1975. During the contract we periodically submitted progress reports and technical reports to our project monitors. In this final report we will summarize the work which we have accomplished under this Contract.

We engaged in research on computer recognition of handwritten characters. This work resulted in a Ph.D. dissertation and several publications. The techniques we developed are currently used by engineers at the Naval Ocean Research and Development Activity in their cartography research.

We initiated research on the automation of map reading. We have developed computer programs to recognize symbols on maps and to display (or print) the selected symbols and their relative positions. In other words, our programs were able to read maps and to lift the desired information from the maps. From this research, a Ph.D. dissertation was written, and a paper was presented at the Fall Joint Computer Conference in 1972. Engineers at the NORDA are planning to employ our approaches in their cartography work.

We conducted research in picture processing and feature extraction. We have developed techniques to extract features and to identify objects in a picture. We designed a CPA (Cellular Picture Analyzer). A paper on this system was presented at the IEEE Computer Society Workshop on Pattern Recognition in 1972. Furthermore, on the basis of this research a Ph.D. dissertation was prepared.

We developed a line drawing processing system for interactive storage, retrieval and editing. This information system is capable of performing picture file generation, pictorial data retrieval, display and editing. The design of the data structure makes use of arc-primitive graph representation. A simple language, called LIDLANG, is introduced to describe two-dimensional pictures. This work resulted in a Ph.D. dissertation and several publications.

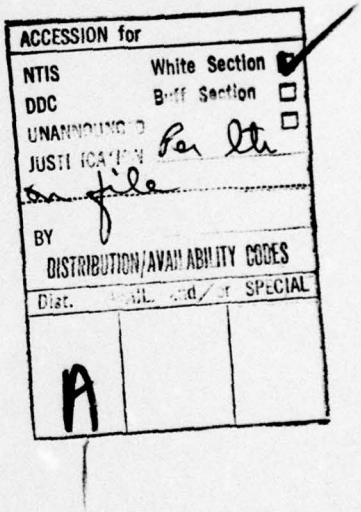
In addition, we have done work in pattern recognition, texture analysis, image processing, three-dimensional computer graphics. These studies have produced several masters theses and a number of publications. A list of the Ph.D.

dissertations, masters theses, and publications of the research work is given in the appendix.

During the contract period we have contributed to the understanding of information systems for handling pictorial data. Our research under this Contract has laid some ground work and has developed some basic techniques for the design of improved information systems.

Julius T. Tou

May 1976



Appendix

(1) Ph.D. Dissertations

R. C. Gonzalez - Automatic Recognition of Handwritten Characters via feature extraction, 1970.

R. H. Cofer - The Automation of Map Reading, 1971.

P. P. Lin - Object Extraction and Identification in Picture Processing, 1972.

J. K. Yoo - LDPS - A Line Drawing Processing System for Interactive Storage, Retrieval and Editing, 1975.

(2) Masters Theses

J. K. Yoo - An Interactive Graphic Display System for Logic Drawings, 1971.

D. L Houseman - Design of a Picture Processing Laboratory, 1972.

T. G. Kennedy - Peripheral Perspective and Hemispherical Mapping in Three-dimensional Computer Graphics, 1973.

D. B. Kao - Statistical Model for Texture Synthesis and Recognition, 1974.

(3) Publications

1. "Feature Extraction in Pattern Recognition", Pattern Recognition Journal, Vol. I, No. 1, 1968.

2. "Information Theoretic Approaches to Pattern Recognition", IEEE International Convention Record, 1968.

3. "Some Results in Minimum-Entropy Feature Extraction", Proceedings of the Region III IEEE Convention, 1968.

4. "Stochastic Automata and Discrete Systems Theory", in Applied Automata Theory, Academic Press, New York, 1968.

5. "Engineering Principles of Pattern Recognition", in Advances in Information Systems Science, Vol. 1, Plenum Press, New York, 1968.

6. "Application of Error-Correcting Codes in Computer Reliability Studies", IEEE Transactions on Reliability, 1969.

7. "Feature Selection for Pattern Recognition Systems", in Methodologies of Pattern Recognition, Academic Press, New York, 1969.

8. "On Feature Encoding in Picture Processing by Computer", Proceedings of the 7th Allerton Conference, University of Illinois, Urbana, Illinois, 1969.

9. "Some Approaches to Scene Extraction", Proceedings of the S.P.I.E. Pattern Recognition Seminar, 1969.

10. "Storage and Retrieval Aspects in Learning Control", Proceedings of the U.S.-Japan Seminar on Learning Process in Control Systems, Nagoya University, Nagoya, Japan, 1970.

11. "Software Engineering - A New Profession", in Software Engineering, Vol. 1, Academic Press, New York, 1970.

12. "Preprocessing for Pictorial Pattern Recognition", Proceedings of the NAIO 21st Technical Symposium on Artificial Intelligence, Italy, 1971.

13. "Some Properties of Feature Extraction via Linear Transformation", Proceedings of Mexico 1971 International IEEE Conference on Systems, Networks and Computers, 1971.

14. "Picture Acquisition and Graphical Preprocessing System," Proceedings of the Ninth Annual IEEE Region 3 Convention, Charlottesville, Virginia, 1971.

15. "Learning Control via Associative Retrieval and Inference", in Pattern Recognition and Machine Learning, Plenum Press, New York, 1971.

16. "Automatic Recognition of Handwritten Characters via Feature Extraction and Multi-level Decision", International Journal of Computer and Information Sciences, Vol. 1, No. 1, 1972.

17. "Automated Map Reading and Analysis by Computer", Proceedings of the Fall Joint Computer Conference, Los Angeles, California, 1972.

18. "Recognition of Handwritten Characters by Topological Feature Extraction and Multilevel Categorization", IEEE Transactions on Computers, Vol. C-21, No. 7, 1972.

19. "Information Systems", Proceedings of the Third German Computer Conference, Hamburg, 1973.

20. "Interactive Processing of Chinese Characters and Texts", Proceedings of the First International Symposium on Computers and Chinese Input/Output Systems, Taiwan, 1973.

21. "A Line Drawing Processing System - LDPS - for interactive Storage, Retrieval and Editing", Proceedings of 1975 SID International Symposium, Washington, D. C., 1975.

22. "Design of Pictorial Information System", Proceedings of the Fourth Texas Conference on Computing Systems, Austin, Texas, 1975.

23. "The Design of an Interactive Picture Processing System", Proceedings of the 1975 IEEE Southeastern Symposium on System Theory, Auburn University, Alabama, 1975.

24. "Image Processing for Picture Editing", Proceedings of 1975 IEEE Southeastern Conference, Charlotte, North Carolina, 1975.